



**DEPARTMENT OF THE NAVY**  
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST  
INTEGRATED PRODUCT TEAM WEST  
2001 JUNIPERO SERRA BOULEVARD, SUITE 600  
DALY CITY, CALIFORNIA 94014-1976

IN REPLY REFER TO:

Ser 05/445  
March 31, 2005

Mr. Phillip A. Ramsey  
U.S. Environmental Protection Agency  
Region IX  
75 Hawthorne Street  
San Francisco, CA 94105

**Re: ADDENDUM TO DRAFT FINAL SAMPLING AND ANALYSIS PLAN  
ADDITIONAL GROUNDWATER INVESTIGATION AT TIDAL AREAL  
LANDFILL, SITE 1, NAVAL WEAPONS STATION SEAL BEACH,  
DETACHMENT CONCORD, CONCORD, CALIFORNIA**

Dear Mr. Ramsey,

On December 21, 2004 the Navy provided you with the "Draft Final Sampling and Analysis Plan (Field Sampling Plan / Quality Assurance Project Plan) Additional Groundwater Investigation at Tidal Area Landfill, Site 1, Naval Weapons Station Seal Beach, Detachment Concord" (draft final SAP). The U.S. Environmental Protection Agency (U.S. EPA), while not disputing the draft final SAP, did provide the Navy with comments on the document in your letter of February 17, 2005. In addition, the Navy received comments on the draft final SAP from the California Department of Fish and Game, and the San Francisco Bay Regional Water Quality Control Board. Although the draft final SAP effectively became the final SAP on January 21, 2005 per provisions of the Federal Facility Agreement (FFA), the Navy felt it would be beneficial to address and make changes based on Agency comments. Therefore, the Navy has prepared and is hereby providing the U.S. EPA with responses to comments received on the draft final SAP, as well as an Addendum to the draft final SAP that incorporates changes based on the comments.

We trust that this addendum is acceptable and we look forward to initiating the fieldwork. If you have any questions regarding the enclosed plan, please contact Mr. Lik-See Chung of our office at telephone No. 650-746-7454 or Internet e-mail: [lik-see.chung.ctr@navy.mil](mailto:lik-see.chung.ctr@navy.mil)

Sincerely,

Stephen F. Tyahla, P.E., CHMM  
Lead Remedial Project Manager

Enclosure

Copy to:

U.S. Environmental Protection Agency, Region 9 (Attn: Sonce de Vries)  
National Oceanic and Atmospheric Administration (Attn: Denise Klimas)

March 31, 2005

**Re: ADDENDUM TO DRAFT FINAL SAMPLING AND ANALYSIS PLAN  
ADDITIONAL GROUNDWATER INVESTIGATION AT TIDAL AREAL  
LANDFILL, SITE 1, NAVAL WEAPONS STATION SEAL BEACH,  
DETACHMENT CONCORD, CONCORD, CALIFORNIA**

Copy to (continued):

National Oceanic and Atmospheric Administration (Attn: Laurie Sullivan)

U.S. Fish and Wildlife Service (Attn: Dan Welsh)

California Department of Toxic Substances Control Region 1 (Attn: Jim Pinasco)

California Regional Water Quality Control Board, SFBAY (Attn: Laurent Meillier)

California Department of Fish and Game (Attn: Frank Gray)

Contra Costa County Environmental Health, LEA (Attn: Agnes T. Vinluan)

Cal/EPA Integrated Waste Management Board Permitting &

Enforcement Division (Attn: Frank Davies)

Restoration Advisory Board (RAB) Co-Chair (Attn: Ms. Mary Lou Williams)

RAB Member Lisa Anich

RAB Member Chris Boyer

RAB Member Kevin Cornish

RAB Member David Griffith

RAB Member Gregory Glaser

RAB Member Jessica Hamburger

RAB Member Ed McGee

RAB Member Mario Menesini

RAB Member Ray O'Brien

RAB Member Igor Skaredoff

Clearwater Consultants (Attn: Patrick Lynch)

Tech Law, Inc. (Attn: Jennifer Hollingsworth)

NWS Seal Beach, N45WS (Attn: Margaret Wallerstein)

NWS Seal Beach, N09WS (Attn: Gregg Smith)

EFD Southwest (3) (Diane Silva- Admin Record/IR/Base copy)

TtEMI San Francisco (Attn: Joanna Canepa)

TtEMI San Francisco (Attn: John Bosche)

**GENERAL SERVICES ADMINISTRATION**

**CONTRACT NUMBER GS-10F-0076K**

**DELIVERY ORDER NUMBER 62474-01-F-6036**



**Addendum to  
Sampling and Analysis Plan  
(Field Sampling Plan/Quality Assurance Project Plan)  
Additional Groundwater Investigation at  
Tidal Area Landfill, Site 1**

**Naval Weapons Station Seal Beach Detachment Concord  
Concord, California**

***GSA.032.015***

**March 31, 2005**



**Department of the Navy  
Integrated Product Team, West  
Daly City, California**



**TETRA TECH, INC.**

**GENERAL SERVICES ADMINISTRATION**

CONTRACT NUMBER: GS-10F-0076K

Order No: N62474-01-F-6036

**GSA.032.015**

**ADDENDUM 01**

**SAMPLING AND ANALYSIS PLAN**

(Field Sampling Plan/Quality Assurance Project Plan)

**ADDITIONAL GROUNDWATER INVESTIGATION**

**AT TIDAL AREA LANDFILL, SITE 1**

Naval Weapons Station Seal Beach Detachment Concord  
Concord, California

**March 31, 2005**

Prepared for:



DEPARTMENT OF THE NAVY

Integrated Product Team West

Daly City, California

Prepared by



TETRA TECH EM INC.  
135 Main Street, Suite 1800  
San Francisco, California 94105  
(415) 543-4880



**John Bosche, PE, Project Manager**

**Addendum to**

**Sampling and Analysis Plan  
(Field Sampling Plan/Quality Assurance Project Plan)  
Additional Groundwater Investigation at Tidal Area Landfill, Site1  
Naval Weapons Station Seal Beach Detachment Concord  
Concord, California**

**Contract Number: GS-10F-0076K  
Order Number N62474-03-F-4032**

**Prepared for:**

**DEPARTMENT OF THE NAVY**

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**REVIEW AND APPROVAL**

**Tetra Tech Program**

**QA Manager:**

Kevin Hoch For  
Greg Swanson, Tetra Tech

Date: 29-Mar-05

**Navy QA Officer:**

Narciso A. Ancog  
Narciso A. Ancog

Date: 3/31/2005

## DISTRIBUTION LIST

Name	Responsibility	Affiliation
Steve Tyahla	Remedial Project Manager	Southern Division, Naval Facilities Engineering Command, Integrated Product Team West
Margaret Wallerstein	Installation Restoration Manager	Naval Weapons Station Seal Beach
Narciso A. Ancog	Quality Assurance (QA) Officer	Naval Facilities Engineering Command, Southwest Division
Phillip Ramsey	Remedial Project Manager	U.S. Environmental Protection Agency, Region 9
Jim Pinasco	Remedial Project Manager	California Environmental Protection Agency, Department of Toxic Substances Control
Laurent Meillier	Remedial Project Manager	California Regional Water Quality Control Board, San Francisco Bay
Greg Swanson	Program QA Manager	Tetra Tech EM Inc.
Kevin Hoch	Project QA Officer	Tetra Tech EM Inc.
Joanna Canepa	Program Manager	Tetra Tech EM Inc.
John Bosche	Project Manager	Tetra Tech EM Inc.
Sara Woolley	Analytical Coordinator	Tetra Tech EM Inc.
To Be Determined	Field Team Leader	Tetra Tech EM Inc.

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## ACRONYMS AND ABBREVIATIONS

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µg/L	Micrograms per liter
%Rec	Percent recovery
AWQC	Ambient water quality criteria
bgs	Below ground surface
DDT	Dichlorodiphenyltrichloroethane
DDE	Dichlorodiphenyldichloroethene
DQO	Data quality objective
EPA	U.S. Environmental Protection Agency
FSP	Field sampling plan
ID	Identification
IDW	Investigation-derived waste
L	Liter
LC/MS/MS	Liquid chromatography/mass spectrometry/mass spectrometry
LCS	Laboratory control sample
LUFT	Leaking underground fuel tank
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mL	Milliliter
MS	Matrix spike
MSD	Matrix spike duplicate
NA	Not applicable
NWS SBD	Naval Weapons Station Seal Beach Detachment
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PRRL	Project-required reporting limit
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
RWQCB	California Regional Water Quality Control Board

## **ACRONYMS AND ABBREVIATIONS (Continued)**

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SAP	Sampling and Analysis Plan
SWDIV	Naval Facilities Engineering Command, Southwest Division
SVOC	Semivolatile organic compound
TAL	Target analyte list
TDS	Total dissolved solids
Tetra Tech	Tetra Tech EM Inc.
TPH	Total petroleum hydrocarbons
TPH-e	TPH-extractable
TPH-p	TPH-purgeable
TSS	Total suspended solids
UST	Underground storage tank
VOC	Volatile organic compound

## 1.0 PROJECT DESCRIPTION AND MANAGEMENT

Tetra Tech EM Inc. (Tetra Tech) is submitting this addendum to the “Draft Final Sampling and Analysis Plan [SAP] for Additional Investigation of Groundwater at the Tidal Area Landfill (Site 1), Naval Weapons Station Seal Beach Detachment (NWS SBD) Concord” ([Tetra Tech 2004](#)) approved by the Navy on December 21, 2004. Upon review of comments from regulatory and public agencies of the draft final SAP and at the direction of the Department of the Navy, Tetra Tech is submitting this addendum to document changes to field events regarding groundwater investigation in the Tidal Area Landfill (Site 1). All sections of the draft final SAP not discussed in this addendum remain in effect and are applicable to this field event.

As noted in the draft final SAP, Tetra Tech will install and develop five monitoring wells along the perimeter of the Tidal Area Landfill. These five new monitoring wells, seven existing wells, and three existing piezometers will be sampled to evaluate chemical concentrations in groundwater migrating from the landfill. Tetra Tech prepared the additional groundwater investigation draft final SAP, consisting of a field sampling plan (FSP) and a quality assurance project plan (QAPP), in an integrated format to guide the field, laboratory, and data reporting efforts associated with this project. Based on comments from regulatory agencies on the draft final SAP, this addendum describes proposed changes to the draft final SAP, specifically which groundwater monitoring wells will be used for the tidal influence study and the collection of additional groundwater for analysis of polychlorinated biphenyls (PCB) congeners. This SAP Addendum also includes laboratory pH analysis to evaluate pH of groundwater samples collected.

Tables in the main text of the document and in the appendices that have changed from the draft final SAP are included with this SAP addendum. For consistency between the SAP addendum and the draft final SAP, the original table numbers, figure numbers and appendix labeling has been retained. Because tables, figures, and appendices retain their original numbers, tables, figures, and appendices are not sequentially numbered in this document. Also for ease of use, significant additions, changes, and clarifications to the SAP are highlighted in gray.

Tables and figures follow their first reference in the text in this document. [Appendix A](#) contains goals for method precision and accuracy. [Appendix C](#) lists project-required reporting limits (PRRL). An additional appendix ([Appendix H](#)) is included with this SAP addendum to provide Navy responses to agency comments on the draft final SAP.

## 2.0 PURPOSE OF THE INVESTIGATION

As stated in the draft final SAP, the purpose of this investigation is to install additional monitoring wells that will be used to address potential data gaps and to collect data to assess whether chemicals are leaching to groundwater and migrating from the landfill at concentrations that exceed estimated ambient levels or water quality screening criteria. The work will be conducted as indicated in the draft final SAP but as modified by this addendum. This addendum adds groundwater analysis for PCB congeners because of the possibility that PCBs may be present within the landfill waste. Laboratory analysis of pH has also been added. Additionally, at the request of regulatory agencies, the locations of groundwater monitoring wells for the proposed tidal influence study have been slightly revised, as documented in this addendum.

### 3.0 QUALITY OBJECTIVES AND CRITERIA

The data quality objectives (DQO) stated in the draft final SAP remain; however, based on regulatory agency comments, the results of the tidal influence study are identified as inputs to the decisions. Subsequently, Step 3 of the DQO table ([Table 4](#)) has been revised in this addendum to include the results from the tidal influence study.

[Table 6](#) lists key personnel. The table has been revised to include current personnel.

#### **TABLE 4: SAP ADDENDUM DATA QUALITY OBJECTIVES**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

<b>STEP 1: State the Problem</b>
<ul style="list-style-type: none"><li>• Contaminants may be migrating from the Tidal Area Landfill (Site 1) through groundwater.</li></ul>
<b>STEP 2: Identify the Decisions</b>
<ol style="list-style-type: none"><li>1. Are contaminants in groundwater migrating from the Tidal Area Landfill (Site 1)?</li><li>2. Do chemical concentrations in groundwater that are migrating from the Tidal Area Landfill exceed water quality screening criteria?</li></ol>
<b>STEP 3: Identify Inputs to the Decisions</b>
<ul style="list-style-type: none"><li>• Results from previous investigations.</li><li>• Review of historical and current aerial photographs.</li><li>• Results from groundwater level measurements and quarterly groundwater sampling.</li><li>• Results from aquifer (slug) tests.</li><li>• Comparison with appropriate screening criteria.</li><li>• Results from the tidal influence study.</li></ul>
<b>STEP 4: Define Study Boundaries</b>
<ul style="list-style-type: none"><li>• The lateral extent of this investigation is the Tidal Area Landfill and surrounding environments.</li><li>• The vertical extent of this investigation extends from surface water to the depth of the existing monitoring wells installed at the Tidal Area Landfill.</li><li>• Temporal boundaries extend through the period of performance of the delivery order.</li></ul>
<b>STEP 5: Develop Decision Rules</b>
<ol style="list-style-type: none"><li>1. If chemical concentrations in groundwater samples collected downgradient of the Tidal Area Landfill are greater than the concentrations in groundwater from upgradient wells, then it will be assumed that contaminants are migrating from the Tidal Area Landfill. Results for both upgradient and downgradient samples will be compared using the Wilcoxon Signed-Rank test. Otherwise, it will be assumed that contamination is not migrating from the Tidal Area Landfill.</li><li>2. If chemical concentrations in groundwater samples collected within potential contaminant migration pathways at the edge of the Tidal Area Landfill exceed water quality screening criteria (see Table C-2 in Appendix C), then further action is needed for groundwater. Otherwise, no further action other than long-term monitoring consistent with landfill closure requirements is required.</li></ol>
<b>STEP 6: Specify Tolerable Limits on Decision Errors</b>
<p>Site-specific sampling objectives and the media investigated limit the use of statistical methods in selecting sampling locations for this investigation. Sampling locations will be selected based on historical source areas, site hydrogeology, and previous data on water quality. Sample results from upgradient and downgradient wells will be compared using the Wilcoxon Signed-Rank test. No tolerable decision error rates were set because the judgmental sampling approach does not allow for the assessment of whether specific error rate limits have been attained.</p>

**TABLE 4: SAP ADDENDUM DATA QUALITY OBJECTIVES (Continued)**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

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**STEP 7: Optimize the Sampling Design**

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- Install two additional water table monitoring wells along the western side of the Tidal Area Landfill, near the planned edge of the landfill cap.
  - Install one additional water table well north of the Tidal Area Landfill.
  - Confirm the locations of the former channels of Otter Sluice that extended beneath the landfill. Install two additional water table monitoring wells within the former channels near the southern perimeter of the landfill.
  - Measure water levels in all Tidal Area monitoring wells and piezometers (including Underground Storage Tank [UST] Sites A3, A16, and E111) on a quarterly basis.
  - Collect and analyze groundwater samples from seven existing Tidal Area Landfill wells and three existing piezometers during the first quarterly sampling event.
  - Conduct a tidal influence survey during both the wet and dry seasons using up to 11 surface water monitoring locations and up to 10 groundwater monitoring wells located throughout the Tidal Area.
  - Measure water levels in Tidal Area monitoring wells and piezometers, including Site 30 and UST Sites A3, A16, and E111, before each tidal influence study and at monthly intervals between the wet and dry season tidal influence studies.
  - Collect and analyze groundwater samples from each of the newly installed monitoring wells during four quarterly sampling events.
  - Conduct aquifer (slug) tests in existing well TLSMW004, existing piezometer RADPZ006, and each of the five newly installed wells that are of sufficient diameter for conducting slug testing.
-

**TABLE 6: KEY PERSONNEL**

SAP, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Name	Organization	Role	Responsibilities	Contact Information
Steve Tyahla	Navy	Remedial project manager	Responsible for overall project execution and coordination with base representatives, regulatory agencies, and Navy management personnel. Participates actively in the DQO process. Provides management and technical oversight during data collection.	Naval Facilities Engineering Command, Engineering Field Activity West, San Bruno, CA <a href="mailto:Stephen.f.tyahla@navy.mil">Stephen.f.tyahla@navy.mil</a> (650) 746-7451
Narciso A. Ancog	Navy	QA officer	Responsible for QA issues for all SWDIV environmental work. Provides government oversight of the Tetra Tech QA program. Reviews and approves the SAP and any significant modifications. Has authority to suspend project activities if Navy quality requirements are not met.	Naval Facilities Engineering Command, Southwest Division, San Diego, CA <a href="mailto:narciso.ancog@navy.mil">narciso.ancog@navy.mil</a> (619) 532-3046
Greg Swanson	Tetra Tech	Program QA manager	Responsible for regular discussion and resolution of QA issues with Navy QA officer. Provides program-level QA guidance to the installation coordinator, project manager, and the Tetra Tech Teams. Reviews and approves SAPs. Identifies nonconformances through audits and other QA reviews. Recommends corrective actions.	Tetra Tech, San Diego, CA <a href="mailto:greg.swanson@ttemi.com">greg.swanson@ttemi.com</a> (619) 525-7188
Kevin Hoch	Tetra Tech	Project QA officer	Responsible for providing guidance to Tetra Tech Teams that are preparing SAPs. Verifies that data collection methods specified in the SAP comply with Navy and Tetra Tech Team requirements. Conducts laboratory evaluations and audits, as necessary.	Tetra Tech, San Francisco, CA <a href="mailto:kevin.hoch@ttemi.com">kevin.hoch@ttemi.com</a> (415) 222-8304
Joanna Canepa	Tetra Tech	Installation coordinator	Responsible for ensuring that all Tetra Tech activities at this installation are carried out in accordance with current Navy requirements.	Tetra Tech, San Francisco, CA <a href="mailto:joanna.canepa@ttemi.com">joanna.canepa@ttemi.com</a> (415) 222-8362
John Bosche	Tetra Tech	Project manager	Responsible for implementing all activities specified in the delivery order. Supervises preparation of the SAP by the Tetra Tech Team. Monitors and directs field activities to ensure compliance with the SAP.	Tetra Tech, San Francisco, CA <a href="mailto:john.bosche@ttemi.com">john.bosche@ttemi.com</a> (415) 222-8295

**TABLE 6: KEY PERSONNEL (Continued)**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Name	Organization	Role	Responsibilities	Contact Information
To be determined	Tetra Tech	Field team lead	Responsible for directing day-to-day field activities conducted by the Tetra Tech Team and subcontractor personnel and providing technical support for the project. Verifies that field sampling and measurement procedures follow the SAP.  Provides the project manager with regular reports on status of field activities.	To be determined
To be determined	Tetra Tech	On-site safety officer	Responsible for implementing the health and safety plan, determining appropriate site control measures, and identifying personal protection levels. Leads daily safety briefings for the Tetra Tech, subcontractor personnel, and site visitors.  Has authority to suspend operations that threaten health and safety.	To be determined
Sara Woolley	Tetra Tech	Analytical coordinator	Responsible for working with the Tetra Tech Team to define analytical requirements. Assists in selection of a laboratory to complete required analyses (see Section 2.4 of SAP). Coordinates with the laboratory project manager on analytical requirements, delivery schedules, and logistics. Reviews laboratory data before they are released to the Tetra Tech Team.	Tetra Tech, San Francisco, CA <a href="mailto:sara.woolley@ttemi.com">sara.woolley@ttemi.com</a> (415) 222-8304
Wing Tse	Tetra Tech	Database manager	Responsible for developing, monitoring, and maintaining project database under guidance of the project manager. Works with the project chemist to resolve sample identification issues during preparation of the SAP.	Tetra Tech, San Francisco, CA <a href="mailto:wing.tse@ttemi.com">wing.tse@ttemi.com</a> (415) 222-8326
To be determined	Laboratory	Project manager	Responsible for delivering analytical services that meet the requirements of the SAP. Reviews and understands all analytical requirements in the SAP. Works with the project chemist to confirm sample delivery schedules. Reviews the laboratory data package before it is delivered to the project chemist.	
To be determined	Subcontractor	Project manager	Responsible for ensuring that subcontractor activities are conducted in accordance with the requirements of the SAP. Coordinates subcontractor activities with the project manager or field team leader.	

## Notes:

DQO Data quality objective  
QA Quality assurance

SAP Sampling and analysis plan  
Tetra Tech Tetra Tech EM Inc.



## 4.0 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The geologic and hydrogeologic conditions described in the draft final SAP remain. However, it should be noted that a greater influx of surface water has inundated the R Area (Site 2) in recent years, for a variety of reasons. The gradual failure of the tide gate has allowed surface water to regularly enter Otter Slough to a higher elevation than was previously possible. In the past, the highest surface water levels in Otter Slough would overtop the Baker Road levee in the winter, but large portions of the Site 2 did not flood during the summer. At present, the surface water regularly overtops Baker Road during high tides to the degree that large portions of Site 2 are permanently flooded. The regular overtopping of Baker Road that now occurs is the result of degradation of the tide gate, surface water inflows into Otter Slough from Hasting Slough, and the natural subsidence of Baker Road into the marshland where the levee is constructed. As Baker Road subsides, flows that overtop the levee are responsible for some erosion and further lower of the crest of Baker Road. The combined effect of these changes is a permanent body of water in Site 2 in an area that formerly dried up annually.

## 5.0 TIDAL INFLUENCE SURVEY AND WATER LEVEL MEASUREMENTS

As stated in the draft final SAP, a tidal influence study will be conducted once during the wet season and once during the dry season to measure the magnitude and time lag of fluctuations between surface water and groundwater levels caused by tidal influence in the Tidal Area. The extent of tidal fluctuation in surface water in the Site 2 has not been established since being continually inundated with surface water.

A revised version of [Figure 3](#) is included with this SAP addendum to make the well identification numbers consistent with the other figures in the draft final SAP.

As requested by the U.S. Environmental Protection Agency (EPA) the Navy will include well TLSMW005 in the tidal influence study in place of well RADMW005. TLSMW005 is located on the east side of the landfill and no other well is being measured for tidal influence near that location. RADMW005 is located in Site 2 and there are several other wells that are already proposed for tidal influence study in Site 2. [Table 8](#) and [Figure 7](#) indicate the revised monitoring locations for the tidal influence study proposed.

## 6.0 DATA GENERATION AND ACQUISITION

The data generation and acquisition strategy for groundwater samples described in the draft final SAP remains; however at the request of regulatory agencies, additional analysis will be performed for PCB congeners. Laboratory determination of groundwater pH has also been added. [Table 10](#) indicates the proposed samples, rationale, and analytical suite, revised to include PCB congeners. [Table 12](#) presents the type of sample containers to be used for each analysis, the sample volumes required, the preservation requirements, and the maximum holding times for samples before extraction and analysis, revised to include PCB congeners.

The tidal influence study will first be conducted during the summer when surface water levels are expected to be the lowest. Based upon review of aerial photographs, it is not clear if proposed surface water monitoring locations TSW-8, TSW-9, and TSW-10 will be have the same water

elevation at that time. If it is determined that these three measurement locations have identical surface water elevations, two of the monitoring stations will be eliminated from the dry season and wet season tidal influence surveys.

The draft final SAP includes the following statement:

*“If no tidal influence is observed at a surface water location or in a well during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey”*

Because it is anticipated that the dry season tidal influence study will be conducted prior to the wet season tidal influence survey, the field work will be conducted as follows:

*“If no tidal influence is observed at a surface water location or in a well during the dry season tidal influence survey, the surface monitoring location or well will not be included in the wet season tidal influence survey.”*

**TABLE 8: PROPOSED TIDAL INFLUENCE STUDY MONITORING LOCATIONS**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill,  
 Naval Weapons Station Seal Beach, Detachment Concord, Concord, California

Location Name	Surface Water or Groundwater Monitoring Location	Name of Site or Surface Water Feature
TSW-1	Surface Water	Suisin Bay
TSW-2	Surface Water	Otter Slough
TSW-3	Surface Water	Site 2, R Area Disposal
TSW-4	Surface Water	Otter Slough
TSW-5	Surface Water	Site 11, Wood Hogger
TSW-6	Surface Water	Otter Slough
TSW-7	Surface Water	Otter Slough
TSW-8	Surface Water	Site 2, R Area Disposal
TSW-9	Surface Water	Site 2, R Area Disposal
TSW-10	Surface Water	Site 2, R Area Disposal
TSW-11	Surface Water	Site 9, Froid and Taylor
RADMW002	Groundwater	Site 2, R Area Disposal
RADMW003	Groundwater	Site 2, R Area Disposal
RADPZ001	Groundwater	Site 2, R Area Disposal
TLSMW001	Groundwater	Site 1, Tidal Area Landfill
TLSMW002	Groundwater	Site 1, Tidal Area Landfill
TLSMW005	Groundwater	Site 1, Tidal Area Landfill
TLSMW008	Groundwater	Site 1, Tidal Area Landfill
TLSMW010	Groundwater	Site 1, Tidal Area Landfill
FTSMW003	Groundwater	Site 1, Tidal Area Landfill
WHSMW002	Groundwater	Site 11, Wood Hogger
WHSMW003	Groundwater	Site 11, Wood Hogger

Note:

All locations are shown on Figure 1.

## Figures 3 & 7

These detailed station maps have been deleted from the Internet-accessible version of this document as per Department of the Navy Internet security regulations.

**TABLE 10: PROPOSED SAMPLES, RATIONALE, AND ANALYSES**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
 Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location Name	Sample ID Number	Analyses	Existing or Proposed Well or Piezometer	Rationale
TLSMW001	032TL01GW001	Target Analyte List (TAL) Metals	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW002	032TL02GW002	Hexavalent chromium	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW003	032TL03GW003	Mercury	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW004	032TL04GW004	VOCs	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW005	032TL05GW005	SVOCs (including n-nitrosodimethylamine)	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW006	032TL06GW006	Pesticides	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW007	032TL07GW007	Explosives	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW008	032TL08GW008	Perchlorate	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW009	032TL09GW009	TPH-extractables	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW010	032TL10GW010	TPH-purgeables	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW011	032TL11GW011	1,4-dioxane	Existing	Ongoing evaluation of off-site impacts to groundwater from landfill.
TLSMW012	032TL12GW012	1,2,3-trichloropropane	Existing	Sample from sand unit east of landfill. (Sand unit is approximately 18 to 21 feet bgs.)
TLSMW013	032TL13GW013	Total dissolved solids	Existing	Sample from sand unit east of landfill. (Sand unit is approximately 16 to 19.5 feet bgs.)
TLSMW014	032TL14GW014	Total suspended solids	Existing	Sample from sandy silt unit at eastern landfill perimeter. (Sandy silt unit is approximately 20 to 21.5 feet bgs.)
TLSMW015	032TL15GW015	General anions	Existing	Sample from sandy silt unit at eastern landfill perimeter. (Sandy silt unit is approximately 20 to 21.5 feet bgs.)
TLSMW016	032TL16GW016	PCB congeners	Existing	Sample from sandy silt unit at eastern landfill perimeter. (Sandy silt unit is approximately 20 to 21.5 feet bgs.)
TLSMW017	032TL17GW017	pH	Existing	Sample from sandy silt unit at eastern landfill perimeter. (Sandy silt unit is approximately 20 to 21.5 feet bgs.)
TLSMW018	032TL18GW018		Proposed	Samples from shallow groundwater at northwestern perimeter of landfill.
TLSMW019	032TL19GW019		Proposed	Samples from shallow groundwater at western perimeter of landfill.
TLSMW020	032TL20GW020		Proposed	Samples from shallow groundwater within former drainage feature.

**TABLE 10: PROPOSED SAMPLES, RATIONALE, AND ANALYSES (Continued)**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
 Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Location Name	Sample ID Number	Analyses	Existing or Proposed Well or Piezometer	Rationale
TLSMW011	032TL11GW014	Same as above	Proposed	Samples from shallow groundwater within former drainage feature.
TLSMW012	032TL12GW015		Proposed	Samples from shallow groundwater at northern perimeter of landfill.
Field Duplicate	032TLXXGW016		TBD	Assess precision of field sampling.
Field Duplicate	032TLXXGW017		TBD	Assess precision of field sampling.
Equipment Rinsate	032TL00GW018		NA	Assess adequacy of equipment decontamination.
Equipment Rinsate	032TL00GW019		NA	Assess adequacy of equipment decontamination.
Trip Blank	032TL00GW020		NA	Assess potential contamination during transport.
Source Water Blank	032TL00GW021		NA	Assess purity of water to be used for decontamination.

Notes:

bgs Below ground surface  
 NA Not applicable  
 PCB Polychlorinated biphenyls  
 SVOC Semivolatile organic compound  
 TBD To be determined in the field  
 TPH Total petroleum hydrocarbon. Includes TPH-purgeable (TPH-p) and TPH-extractable (TPH-e)  
 VOC Volatile organic compound

**TABLE 12: SAMPLE CONTAINER, PRESERVATIVE, AND HOLDING TIME REQUIREMENTS**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
 Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Parameter	Method Number	Sample Volume	Sample Container	Preservative	Holding Time <sup>a</sup>
TPH-Extractables (diesel- and motor oil-range organics)	EPA 8015B, SW-846	Two 1-L	Amber glass with Teflon-lined lid	Cool 4 ± 2°C	7 days/40 days
TPH-Purgeables (gasoline-range organics)	EPA 8015B, SW-846	Three 40-mL	Amber glass vials with Teflon-lined lid	pH < 2 with HNO <sub>3</sub> ; Cool 4 ± 2°C	14 days
Metals (except mercury)	EPA 6010B, SW-846	1-L	Polyethylene	pH < 2 with HNO <sub>3</sub> ; Cool 4 ± 2°C	6 months
Mercury	EPA 1631	100-mL	Polyethylene	pH < 2 with HNO <sub>3</sub> ; Cool 4 ± 2°C	28 days
Hexavalent chromium	EPA 7196A, SW-846	500-mL	Polyethylene	Cool 4 ± 2°C	24 hours
VOCs	EPA 8260B, SW-846	Three 40-mL	Amber glass vials with Teflon-lined lid	pH < 2 with HCL; Cool 4 ± 2°C	14 days
SVOCs	EPA 8270C, SW-846	Two 1-L	Amber glass with Teflon-lined lid	Cool 4 ± 2°C	7 days/40 days
Pesticides	EPA 8081A, SW-846	Two 1-L	Amber glass with Teflon-lined lid	Cool 4 ± 2°C	7 days/40 days
Explosives	EPA 8330, SW-846	Two 1-L	Amber glass with Teflon-lined lid	Cool 4 ± 2°C	7 days/40 days
Perchlorate <sup>b</sup>	EPA 314.0	Three 40-mL	Amber glass vials with Teflon-lined lid	Cool 4 ± 2°C	28 days
Perchlorate <sup>b</sup>	EPA 8321A, SW-846 modified to include LC/MS/MS	250-mL	Glass or Polyethylene	Cool 4 ± 2°C	28 days
Total dissolved solids	EPA 160.1	One 1-L	Glass or Polyethylene	Cool 4 ± 2°C	7 days
Total suspended solids	EPA 160.2	One 1-L	Glass or Polyethylene	Cool 4 ± 2°C	7 days
General anions	EPA 300.1	Two 500-mL	Polyethylene	Cool 4 ± 2°C	28 days
PCB congeners	EPA 8082, SW-846	Two 1-L	Amber glass with Teflon-lined lid	Cool 4 ± 2°C	7 days/40 days
pH	EPA 9040	250-mL	Polyethylene	Cool 4 ± 2°C	24 hours

## TABLE 12: SAMPLE CONTAINER, PRESERVATIVE, AND HOLDING TIME REQUIREMENTS (Continued)

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Notes: More than one analysis can be obtained from the same sample container. The sample quantities listed in the table are the amounts necessary if only the specific analysis is requested. The laboratory will indicate which of the analyses can be performed from the same container so that a smaller quantity of sample can be collected at each depth.

Analyses for characterization of investigation-derived waste (IDW) samples are included in the table.

General anions include bromide, chloride, fluoride, nitrates, nitrites, ortho-phosphates, and sulfate. None of the anions requires preservatives.

a "x" days/"y" days refers to the maximum number of days from sampling to extraction/the maximum number of days from extraction to analysis.

b All samples will be analyzed by both EPA Method 314.0 and Method 8321M (liquid chromatography/mass spectrometry/mass spectrometry).

EPA	U.S. Environmental Protection Agency	PAH	Polynuclear aromatic hydrocarbon
HCL	Hydrochloric acid	PCB	Polychlorinated biphenyls
HNO <sub>3</sub>	Nitric acid	SVOC	Semivolatile organic compound
L	Liter	TPH	Total petroleum hydrocarbon
mL	Milliliter	VOC	Volatile organic compound
MS/MSD	Matrix spike/matrix spike duplicate		



## REFERENCES

- California Regional Water Quality Control Board (RWQCB). 1995. "San Francisco Bay Basin Water Quality Control Plan." California Regional Water Quality Control Board - San Francisco Bay Region. June 21.
- Tetra Tech EM Inc. 2004. "Draft Final Sampling and Analysis Plan [SAP] for Additional Investigation of Groundwater at the Tidal Area Landfill (Site 1), Naval Weapons Station Seal Beach Detachment (NWS SBD) Concord." December 21.
- U.S. Environmental Protection Agency (EPA). 2002a. "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization (2002 External Review Draft), NCEA-1-0503." Office of Research and Development, National Center for Environmental Assessment, Washington, DC.
- EPA. 2002b. "National Recommended Water Quality by Criteria." Accessed on April 16. On-line Address:  
<http://www.epa.gov/fedregstr/epa-water/1998/december-day-10/w30272.html>

**APPENDIX A**  
**METHOD PRECISION AND ACCURACY GOALS**

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**TABLE A-1: PRECISION AND ACCURACY GOALS**

SAP, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
 Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Compound	QC Type	Analytical Method	Precision (RPD)(a)	Accuracy (% Rec)(b)
			Water	Water
Polychlorinated Biphenyls				
Aroclor-1260	MS/MSD/LCS	EPA 8082 Congeners	50	60-140
Tetra-m-xylene	Surrogate	EPA 8082 Congeners	NA	30-150
Decachlorobiphenyl	Surrogate	EPA 8082 Congeners	NA	30-150
Miscellaneous Analytes				
pH	NA	EPA 9040	NA	NA

Notes:

a Precision as relative percent difference (RPD)

b Accuracy as percent recovery (% Rec)

%Rec Percent recovery

EPA U.S. Environmental Protection Agency

LCS Laboratory control spike (blank spike)

MS/MSD Matrix spike and matrix spike duplicate

NA Not applicable

QC Quality control

RPD Relative percent difference

**APPENDIX C**  
**PROJECT-REQUIRED REPORTING LIMITS**

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**TABLE C-9: COMPARISON OF PROJECT-REQUIRED REPORTING LIMITS AND SCREENING CRITERIA, POLYCHLORINATED BIPHENYL CONGENER METHOD 8082, SW-846**

SAP Addendum, Additional Groundwater Investigation at Tidal Area Landfill, Site 1,  
Naval Weapons Station Seal Beach Detachment Concord, Concord, California

Analyte <sup>a</sup>	Marine Chronic AWQC <sup>1</sup> (µg/L)	Water PRRL (µg/L)	Water PRRL Below Screening Value?
PCB-001	NA	0.034	NA
PCB-005	NA	0.034	NA
PCB-018	NA	0.034	NA
PCB-031	NA	0.034	NA
PCB-044	NA	0.034	NA
PCB-052	NA	0.034	NA
PCB-066	NA	0.034	NA
PCB-087	NA	0.034	NA
PCB-101	NA	0.034	NA
PCB-110	NA	0.034	NA
PCB-138	NA	0.034	NA
PCB-141	NA	0.034	NA
PCB-151	NA	0.034	NA
PCB-153	NA	0.034	NA
PCB-170	NA	0.034	NA
PCB-180	NA	0.034	NA
PCB-183	NA	0.034	NA
PCB-187	NA	0.034	NA
PCB-206	NA	0.034	NA
<b>Total PCBs</b>	<b>0.03</b>	<b>0.034</b>	<b>No<sup>b</sup></b>

Notes:

1 EPA. 2002b. "National Recommended Water Quality Criteria: 2002." EP-822-R-02-047. November.

a PCB congener list based SW-846 method 8082 target analyte list. This congener method is of particular value in determining weathered aroclors.

b The PRRL listed reflects the maximum sensitivity of current, routinely used analytical methods. The PRRL listed will be used as the project screening criteria unless reasonable grounds are established for pursuing non-routine methods.

**APPENDIX H**  
**RESPONSE TO REGULATORY AGENCY AND PUBLIC COMMENTS**

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**RESPONSES TO AGENCY COMMENTS**  
**DRAFT FINAL SAMPLING AND ANALYSIS PLAN**  
**ADDITIONAL GROUNDWATER INVESTIGATION AT TIDAL AREA LANDFILL**  
**NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD**  
**CONCORD, CALIFORNIA (DATED 21 DECEMBER 2004)**  
**March 31, 2005**

The U.S. Environmental Protection Agency (EPA), the San Francisco Bay Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Game, Office of Spill Prevention and Response (DFG-OSPR), reviewed and provided comments on the U.S. Department of the Navy's document, "Draft Final Sampling and Analysis Plan, Additional Groundwater Investigation at Tidal Area Landfill Naval Weapons Station Seal Beach, Detachment Concord, Concord, California," dated December 21, 2004. The agencies' comments are provided in the following text, along with the Navy's responses.

**COMMENTS FROM EPA**

The EPA comments were presented in a letter dated February 17, 2005.

**EPA Comment 1      Tidal Influence Study: U.S. EPA is not clear on a need to evaluate a change in magnitude of fluctuations and time lag of fluctuations in monitoring well water level by tidal influence with past observations. A Navy 1994 Tidal Influence Study concluded that tidal influence was observed in wells within 90-feet of Otter Slough, except at monitoring well RADMW004 (which is approximately 60-feet from Otter Slough and did not exhibit tidal influence). Groundwater elevations varied by 1 foot in response to tidal changes of 2.5 -feet in surface water. Also, U.S. EPA would like clarification on how the tidal influence data will be used to determine if contaminants are migrating from the Site 1 Landfill?**

Response:            The purpose of the new tidal influence study is to evaluate how groundwater currently responds to the tidal changes due to the greater influx of surface water in the Site 2 R Area in recent years. When the 1994 and 1997 tidal influence study was done, the R Area was not regularly inundated and subject to significant tidal influence as is the case now (due to factors such as the malfunction of Otter Slough Tide Gate and other hydraulic connections from Hastings Slough).

The tidal influence study will provide data on the magnitude and time lag for water level fluctuations caused by tidal influence in individual wells. The magnitude and time lag in individual wells relative to the tidal fluctuations occurring in Suisun Bay will be used to evaluate future water level measurements to be collected from the well.

The proposed tidal influence study will clarify the current hydrogeologic setting in the Tidal Area. The hydrology of the Tidal Area can be better understood based on the changes in the levels of surface water and groundwater. If tidal influence is not observed in wells near the landfill, it

suggests a steady-state condition so that fluctuations in groundwater levels measured over time represent a steady-state water table surface and not short-term tidal fluctuations. Collection of groundwater level measurements from various wells will help provide a more complete assessment of direction of groundwater flow throughout the Tidal Area. Along with these measurements, groundwater samples for four quarters from proposed well locations around the landfill will be collected and analyzed. Both sets of data —direction of flow and concentrations of chemicals — will be used to identify whether contaminants are migrating from the landfill and if further investigation is needed.

The current tidal study was proposed as was discussed and outlined in previous correspondence and meetings with EPA and other regulatory agencies. Please refer to Responses to EPA General Comments 2 and 5 in Appendix G of the Draft Final Groundwater Sampling and Analysis Plan (SAP).

**EPA Comment 2      Tidal Influence Study objectives for IR Site 2: Please clarify if the tidal influence study component for IR Site 2 (R-Area Disposal Site) was designed to see if routine flooding into Site 2 from Otter Slough is having short-term/long-term effects on groundwater elevations.**

Response:      The tidal influence study is intended to evaluate if and how much short-term fluctuations of surface water levels at Otter Slough and in the R Area affect groundwater elevations in several wells in the Tidal Area, most of them located in Site 2. As noted in the SAP, this will be accomplished through observation and analysis of continuous monitoring data at selected surface water locations and monitoring wells over a period of several tidal cycles (over a two-day span), for both the dry and wet season.

Evaluation of the long-term seasonal effects of surface water level fluctuations from one part of the year to another on groundwater elevations will be accomplished through observing and analyzing monthly water level measurements 59 locations (includes surface water and groundwater measurement locations) between the dry and wet seasons.

**EPA Comment 3      Please clarify why the Navy proposes to test Site 2 monitoring well RADMW005 (approximately 400-feet from Otter Slough). Given the distance, it appears unlikely that tidal influence would be observed at this well location and therefore is not suitable for tidal influence testing. Also, note that monitoring well RADMW005 is located on higher ground next to Picket Road and is not located in Site 2 Wetlands as suggested by Figure 7 (Proposed Locations for Tidal Influence Study). As an alternative well for testing, please consider conducting the tidal influence study on monitoring well TLSMW005, located on the east side of Site 1, that potentially intercepts a historical drainage channel.**



Response: The EPA correctly points out reasons why tidal influence study at RADMW005 may not yield useful information. As requested by EPA, the Navy will substitute well TLSMW005 for well RADMW005 in the tidal influence study.

**EPA Comment 4** As generally stated above, U.S. EPA is not clear why the Navy has proposed to retest many Tidal Area monitoring wells, for example wells RADMW002 and RADMW003, along Baker Road, which have been previously shown to be tidally influenced by Otter Slough.

Response: EPA has correctly observed that wells RADMW002 and RADMW003 were previously determined to be influenced by tidal fluctuations in Otter Slough. However, the magnitude of response in these wells may be different because tidal conditions have changed with the greater inundation of surface water at Site 2. Therefore, both wells will be kept as part of the tidal survey.

**EPA Comment 5** The Navy has agreed to include underground storage tank (UST) sites A3, A16, and E11 monitoring wells with water elevation surveys. For cost and time savings, the Navy may consider reducing the frequency it measures some UST wells. As a suggestion, the Navy could consider measuring all twelve (12) UST wells during quarterly sampling; however, for monthly measurements, the Navy may consider utilizing one representative well from each UST site.

Response: Reducing the number of wells will not significantly affect the cost and time, since field personnel will still need to go to these UST sites to collect water level measurement(s) each time and the current total of wells at these sites is fairly small (total: 12 for three UST sites). For the sake of consistency with the already proposed measurement locations, the Navy plans to measure water levels at these UST wells as specified in the SAP.

**EPA Comment 6** The Navy proposal to measure surface water elevations at three sites within IR Site 2 (at monitoring locations TSW-8, TSW-9, and TSW-10, with groundwater elevations compared at two wells (RADPZ001 and TLSMW002). U.S. EPA is not clear why three water elevation monitoring locations are needed for the central portion of Site 2, if the entire site is flooded. If the two proposed well locations are both flooded, and the surface water elevations are the same, then only one surface water monitoring location is necessary.

Response: Based upon the Navy's review of aerial photographs, it is not clear if these three areas of Site 2 will have the same surface water levels in the summer (when the surface water elevation is expected to be at it's lowest). After completing the summer surface water level measurements, if it is determined that the entire area has the same surface water elevation, then subsequent measurements will be made from only one measurement location within Site 2. The SAP addendum will clarify this proposed change in approach.

**EPA Comment 7**      **For the Wood-Hogger Area (Site 11), Navy proposes a surface water monitoring location at TSW-4/TSW-5 for comparison with monitoring well WHSMW002. Please clarify if flooding now occurs with some frequency at the northwest corner of Site 11. Similarly, please clarify if flooding also occurs at the southeast corner of Site 11 and to what extent flooding extends north to the Froid and Taylor Road Area (Site 9).**

**Response:**            The recent extent of flooding has not been documented with any systematic measurements. The purpose of the surface water monitoring stations is to systematically measure surface water levels in various regions to evaluate the hydrology of the Tidal Area. If surface water is not present at a measurement station during the event, the condition will be noted on the record.

## **COMMENTS FROM RWQCB**

RWQCB comments were presented in an email memorandum sent on December 24, 2004.

### **RWQCB Comments**

**Waterboard staff recommends improving the sections providing information to groundwater sampling and water levels measurements. The following information is missing from the report:**

**-1- The basis for not including the existing monitoring wells in the second through fourth sampling quarters.**

**-2- Please update section 1.1.6 with statements reporting the broken tidal gate at Otter Slough and how it has affected surface water and possibly groundwater flow in the vicinity and at site 1.**

**-3- Clarify the statement made in section 2.2.2, p 31: "If no tidal influence is observed at a surface water location or in a week during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey."**

**-> Hydrologically quantify wet, dry seasons and tidal influence.**

**-> State when during the tidal cycle water levels will be taken at the sites. DFG and Waterboard staff recommends measuring water levels in an array of reproducible points within the tidal cycle during both the dry and wet seasons.**

**-> Explain how dry season sampling will be precluded if "no tidal influence is observed at a surface water location" during the wet season. How do hydrological contributions to surface water in the area under study differ during the wet and dry seasons sampled within the same tidal amplitude?**

**-4- Please place tidal surface water survey locations near RAD MW001 and northeast of RADPZ002.**

- 5- Please place tidal groundwater survey location at RADPZ002.**
- 6- Please place tidal groundwater survey location at RADMW001.**
- 7- Move groundwater monitoring location TLSMW008 to TLSMW003.**
- 8- Move groundwater monitoring location TLSMW010 to TLSMW011**
- 9- Please add tidal surface water and groundwater survey locations at TLSMW004.**

Response:

1. Existing monitoring wells at the Site 1 Tidal Area Landfill and throughout the Tidal Area have been sampled and analyzed many times in the past (in 1990, 1991, July 1995, October 1995, January 1996, April and May 1996, October 1997, and July 2003). Based on the Navy's previous evaluations, there is little evidence that metals-contaminated groundwater is migrating from any of the Tidal Area Sites including the Tidal Area Landfill. Groundwater in the Tidal Area and at locations around the Tidal Area Landfill do not appear to be affected to any significant extent by organic compounds. In light of these findings, the Navy cannot justify the expenditure of resources to sample and analyze all or a portion of the existing wells within Sites 1, 2, 9, or 11 on a quarterly basis. New wells are proposed in close proximity to the landfill. Because these wells are new, they will be sampled on a quarterly basis for one year.
2. The SAP addendum will indicate the following:  

The gradual failure of the tide gate has allowed surface water to regularly enter Otter Slough to a higher elevation than was previously possible. In the past, the highest surface water levels in Otter Slough would overtop the Baker Road levee in the winter, but large portions of the Site 2 did not flood during the summer. At present, the surface water regularly overtops Baker Road during high tides to the degree that large portions of Site 2 are permanently flooded. The regular overtopping of Baker Road that now occurs is the result of degradation of the tide gate, surface water inflows into Otter Slough from Hasting Slough, and the natural subsidence of Baker Road into the marshland where the levee is constructed. As Baker Road subsides, flows that overtop the levee are responsible for some erosion and further lower of the crest of Baker Road. The combined effect of these changes is a permanent body of water in Site 2 in an area that formerly dried up annually.
3. The sentence reads as follows: *"If no tidal influence is observed at a surface water location or in a **well** during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey"* (emphasis added).

The wet season in the Bay Area varies somewhat; however, this study assumes that the wet season survey of tidal influence is within the period from mid-December through mid-April.

The dry season is from late spring through the fall (from the end of May until mid-October).

Tidal influence is defined as a measurable tidal fluctuation in surface water elevations or groundwater elevations as a result of diurnal tides.

The Navy will attempt to collect data at a time of the month when tidal fluctuations are greatest (the greatest elevation difference between the highest high and the lowest low within a given day or tidal cycle). Although the tidal cycle will be considered, other considerations may not allow data collection at optimal times. Data collection points will be surveyed and reproducible.

The statement, *“If no tidal influence is observed at a surface water location or in a well during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey.”* is intended to mean the following. Surface water will be monitored for at least 2 days (48 hours) at 6-minute intervals; if measurable diurnal tidal fluctuation (consisting of two high and two low tides per 24 hours) is not observed at the recording station, then the station will not be included in the subsequent tidal influence survey. Because it is anticipated that the dry season tidal influence study will be conducted first, the SAP addendum will be revised to indicate the following: *“If no tidal influence is observed at a surface water location or in a well during the dry season tidal influence survey, the surface monitoring location or well will not be included in the wet season tidal influence survey.”*

4. The Navy considers the scope and extent of the proposed tidal influence survey to be fully comprehensive and complete for the following reasons:
  - a. The geologic conditions in the Tidal Area are relatively consistent so that one well location for monitoring is suitable to represent a large area of the site.
  - b. The permeability of the native soils at the site is very low.
  - c. The Navy has proposed multiple locations for the survey and the proposed survey locations span all of the Tidal Area sites.
  - d. A tidal influence survey has already been conducted at the site. Although conditions have changed, tidal influence was not measured at most locations in the first survey and it is likely that most well locations will not detect significant tidal influences during this proposed survey.

The Navy plans to conduct the tidal influence study without modification except as noted in response to EPA comment 3 because the RWQCB has not offered technical justification for the requested changes and because the EPA has not requested similar modifications.

5. Please see response number 4.
6. Please see response number 4.
7. Please see response number 4.
8. Please see response number 4.
9. Please see response number 4.

## **COMMENTS BY DFG-OSPR**

DFG-OSPR comments were presented in a memorandum dated December 28, 2004.

### **DFG-OSPR General Comment 1**

**Based on initial inter-agency coordination, staff from both DFG-OSPR and Regional Water Quality Control Board (RWQCB) recommend the following proposed actions for groundwater sampling and water levels measurements be revised or removed.**

**a. The proposal to exclude the existing monitoring wells from the second through fourth quarters sampling events. DFG-OSPR recommends all - existing and new wells be sampled every quarter.**

**b. The exclusion of locations not expressing “tidal influence” during the wet season sampling from the subsequent dry season sampling as proposed in the following statement. “If no tidal influence is observed at a surface water location or in a well during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey” (Page 31). Please provide sufficient evidence supporting this decision or include all wells for both the wet and dry season sampling.**

Response:

- a. Please see responses to RWQCB Comment 1.
- b. Please see response to RWQCB Comment 3.

### **DFG-OSPR Specific Comment 1**

**Page 5. Please note if any comparisons to ecologically-relevant benchmarks were done during the Remedial Investigation (RI). If so, please describe the results in this paragraph.**

Response:

Results for groundwater samples were not compared with ecological benchmarks during the RI.

### **DFG-OSPR Specific Comment 2**

**Pages 9, 15, and 36 and Figure 2. DFG-OSPR recommends additional sampling in the former location of Otter Slough along the west side of the landfill to address potential preferential groundwater flow and associated contamination for that area.**

Response: As indicated in the SAP, five additional groundwater monitoring wells will be installed and sampled for four quarters to investigate groundwater conditions on the western side of the landfill, in addition to sampling seven existing wells around the entire landfill for the first quarter. Two of the proposed monitoring wells will be installed in former channels of Otter Sluice, to the southwest of the landfill. If groundwater has been adversely affected by the landfill, the array of existing and proposed wells is adequate to evaluate groundwater quality or detect groundwater contamination from the landfill.

**DFG-OSPR Specific Comment 3** **Figure 2. Please use a different color along with the different symbol for the new sampling locations.**

Response: The 15 proposed sampling locations, i.e., the new and existing monitoring wells, are illustrated in red (in contrast to other wells and piezometers noted in black) on Figure 2 of the Draft Final SAP. Symbols are consistent with the type of boring, e.g., proposed monitoring well, existing monitoring well, piezometer.

**DFG-OSPR Specific Comment 4** **Figures 2 and 3. Please use consistent labeling of sampling locations between the two figures, and portray the former water channels on Figure 3 as well.**

Response: **Figure 3** will be revised using the longer monitoring well identification numbers that are indicated on Figure 2. The locations of the former water channels are not pertinent to the locations of geologic cross sections. Please refer to Figure 2 for these features.

**DFG-OSPR Specific Comment 5** **Figure 4. Please clarify whether the area across Johnson Road (PZ-4 and PZ-5) was also used as a disposal or fill area given the geological surface material presented.**

Response: There is no evidence that the area across Johnson Road was ever used as a disposal site. Fill has been placed in most developed areas within the Tidal Area at Naval Weapons Station Seal Beach Detachment (NWSSBD) Concord where roads, railroads, or other improvement are located. Soils logged during excavation of borings PZ-4 and PZ-5 include sand and gravel soils to a depth of approximately 5 feet. The sands and gravels are likely fill materials.

**DFG-OSPR Specific Comment 6** **Pages 15 and 37. PCBs, while generally low solubility, may be associated with suspended sediment particles. In addition, relatively high concentrations of PCBs were detected in landfill soil. Therefore, please add PCBs as analytes to the groundwater sampling.**

Response: Polychlorinated biphenyls (PCBs) will be added to the list of analytes.

**DFG-OSPR Specific Comment 7** **Pages 16, 18, 41. Please justify why existing wells will not be sampled during the last three quarterly sampling events.**

Response: Please see response to RWQCB comment number 1.

**DFG-OSPR  
Specific  
Comment 8**

**Page 18. Please note where the tidal influence study fits within the data quality objectives table with regards to the decisions and decision inputs.**

Response:

The data quality objectives have been revised to indicate that the tidal influence study is included in Step 3. The revised data quality objectives are included in the SAP addendum.

**DFG-OSPR  
Specific  
Comment 9**

**Page 18. Please describe how up-gradient versus down-gradient wells will be identified**

Response:

Assuming that tidal effects are not observed, up-gradient and down-gradient locations will be identified by comparing groundwater levels at various locations. Water levels are higher at upgradient locations. If tidal effects are observed, then measurements during the tidal influence study and tidal corrections will be used to determine up-gradient and down-gradient locations.

**DFG-OSPR  
Specific  
Comment 10**

**Page 18. Please provide details on the long-term monitoring requirements for closed landfills with regards to frequency, sample numbers, and analyte list.**

Response:

Long-term monitoring requirements will be established after the record of decision for groundwater is prepared.

**DFG-OSPR  
Specific  
Comment 11**

**Page 31. Clarify the statement: "If no tidal influence is observed at a surface water location or in a week during the wet season tidal influence survey, the surface monitoring location or well will not be included in the dry season tidal influence survey."**

**a. Hydrologically quantify wet, dry seasons and tidal influence.**

**b. State when during the tidal cycle water levels will be recorded at the sites. DFG-OSPR and RWQCB staff recommend measuring water levels in an array of reproducible points within the tidal cycle during both the dry and wet seasons.**

**c. Explain how dry season sampling will be precluded if "no tidal influence is observed at a surface water location" during the wet season. How do hydrological contributions to surface water in the area under study differ during the wet and dry seasons sampled within the same tidal amplitude?**

Response:

Please see response to RWQCB Comment 3.

**DFG-OSPR  
Specific  
Comment 12**

**Page 32 and Figure 7. Please add the following locations to the tidal influence study:**

**a. Please place tidal surface water survey locations near RAD MWOOI and northeast of RADPZOO2.**

**b. Please place tidal groundwater survey location at RADPZ002.**

**c. Please place tidal groundwater survey location at RADMWOOI .**

**d. Move groundwater monitoring location TLSMW008 to TLSMW003.**

**e. Move groundwater monitoring location TLSMWOIO to TLSMWOI 1**  
**f. Please add tidal surface water and groundwater survey locations at TLSMW004.**

Response: Please see response to RWQCB Comment 4.

**DFG-OSPR  
Specific  
Comment 13**

**Page 31. Please clarify why monitoring probes would not be left for longer periods (minimum of a week rather than 2 days) to encompass a larger range of tidal heights.**

Response: Data acquisition is equipment intensive, and data reduction is labor intensive. The response of wells and surface water locations to tidal fluctuations in Suisun Bay can be adequately established within a 2-day time span using the sensitive equipment proposed.

**DFG-OSPR  
Specific  
Comment 14**

**Figure 7. Please portray the former water channels on this figure.**

Response: The former water channels in the vicinity of the Tidal Area Landfill are best presented on a larger-scale map, such as Figure 2. Please refer to that figure for locations of the water channels.

**DFG-OSPR  
Specific  
Comment 15**

**Figure 7. Several surface water sample locations (e.g., TSW-3, TSW-5, TSW-6, and TSW-8 to TSW-11) are located in areas away from Otter Slough. Will surface water be present during the dry season sampling in these areas?**

Response: Much of Site 2 now floods regularly, even in the summertime. Although the depth or presence of water at specific locations will not be known until measurements are taken, at least some of these locations are expected to be flooded with surface water.

**DFG-OSPR  
Specific  
Comment 16**

**Pages 34 and 35. Please differentiate between surface and groundwater monitoring locations on the table.**

Response: All locations identified “TSW” (TSW-1 through TSW-11) are surface water monitoring locations and shown with a triangle symbol (see [Figure 7](#)). All other locations are groundwater monitoring locations.